

NATURAL RESOURCES CONSERVATION SERVICE
PACIFIC BASIN AREA
CONSERVATION PRACTICE STANDARD
CONSERVATION CROP ROTATION
(Hectare, Acre)
CODE 328

DEFINITION

Growing crops in a recurring sequence on the same field.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion.
- Reduce irrigation induced erosion.
- Maintain or improve soil organic matter content.
- Manage deficient or excess plant nutrients.
- Improve water use efficiency.
- Manage saline seeps.
- Manage plant pests (weeds, insects, diseases).
- Provide food for domestic livestock.
- Provide food and cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland and other land where crops are grown.

This standard does not apply to pastureland, hayland, or other land uses where annual row or close growing crops are grown occasionally only to facilitate renovation or re-establishment of perennial vegetation. It does not apply to land devoted to orchards, vineyards, or nurseries.

CRITERIA

General Criteria Applicable to all Purposes Named Above

Crops shall be grown in a planned, recurring sequence except as outlined in Operation and Maintenance.

Crops shall be adapted to the climatic region and the soil resource. Adapted crops and varieties, listed in appropriate university publications or other approved sources (local FOTG, Section I – Agronomy References) should be selected.

A conservation crop rotation may include crops planted for cover or nutrient enhancement.

Additional Criteria to Reduce Sheet and Rill Erosion

Crops shall be selected that produce enough above and below ground plant biomass to control erosion within the soil loss tolerance (T) or any other planned soil loss objective. The amount of biomass needed shall be determined using current approved erosion prediction technology.

Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Reduce Irrigation Induced Erosion

To reduce erosion induced by furrow irrigation, crops or cover crops shall be selected that are grown within the wetted perimeter of the furrow, or which produce the amount of residue needed to be maintained in the furrow to achieve the soil loss objective.

To reduce erosion induced by sprinkler irrigation, crops or cover crops shall be

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selected that develop surface cover or canopy rapidly or that produce the amount of residue needed to be maintained on the soil surface to achieve the soil loss objective.

The amount of residue needed shall be determined by approved research or current approved erosion prediction technology.

Additional Criteria to Maintain or Improve Soil Organic Matter Content

Crops shall be selected that produce the amount of plant biomass needed to maintain soil organic matter content, as determined by using an available and approved soil analysis tools such (i.e. Soil Conditioning Index Procedure).

If partial removal of residue by means such as baling or grazing occurs, enough residue shall be maintained to achieve the desired soil organic matter content goal.

Cover and green manure crops planted specifically for soil improvement may be grazed as long as grazing is managed to retain adequate biomass.

Additional Criteria to Manage Deficient or Excess Plant Nutrients

Crop selection and sequence shall be determined using an approved nutrient balance procedure.

When crop rotations are designed to add nitrogen to the system, nitrogen-fixing crops shall be grown immediately prior to or interplanted with nitrogen-depleting crops.

To reduce excess nutrients, crops or cover crops having rooting depths and nutrient requirements that utilize the excess nutrients shall be grown.

Additional Criteria to Improve Water Use Efficiency

Selection of crops and varieties, sequence of crops, or the annual decision to plant a crop or to fallow, shall be determined using an approved water balance procedure.

Additional Criteria to Manage Saline Seeps

Crops grown in areas where brackish water is used for irrigation or where sumps have been dug into the sea-level elevation shall be suited for the high chloride content of these conditions.

Additional Criteria to Manage Plant Pests (Weeds, Insects, Diseases)

Crops shall be alternated to break the pest cycle and/or allow for the use of a variety of other control methods. Affected crops and alternate host crops shall be removed from the rotation for the period of time needed to break the life cycle of the targeted pest.

Resistant varieties, listed in appropriate university publications or other approved sources, shall be selected where there is a history of a pest problem. Refer to the Pacific Basin standard, Pest Management (595).

Additional Criteria to Provide Food for Domestic Livestock

Crops shall be selected to balance the feed supply with livestock numbers. The needed amount of selected crops shall be determined using an approved forage-livestock balance procedure. Crops should be evaluated for their palatability, protein content and storage and handling requirements.

Additional Criteria to Provide Food and Cover for Wildlife

Crop selection shall be determined using an approved habitat evaluation procedure. Refer to the Pacific Basin standards, Upland Wildlife Habitat Management (645) and Wetland Wildlife Habitat Management (644).

CONSIDERATIONS

When used in combination with the Pacific Basin standards, Contour Stripcropping (585), or Stripcropping, Field (586), the crop sequence should be consistent with the stripcropping design.

When used in combination with residue management practices, selection of high residue producing crops and varieties, use of cover crops, and adjustment of plant population and row spacing can enhance

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production of the kind, amount, and distribution of residue needed.

When sheet and rill erosion is a concern, consider adjusting planting dates to avoid tillage operations and the hazard can be reduced by applying the Pacific Basin standards, Mulching (484), Contour Farming (330), or Contour Stripcropping (585) during the rainy season.

Where maintaining or improving soil organic matter content is an objective, the effects of this practice can be enhanced by managing crop residues, utilizing animal wastes, or applying mulches to supplement the biomass produced by crops in the rotation.

Where excess plant nutrients or soil contaminants are a concern, rotating deep rooted crops or cover crops with shallow rooted crops can help recover the nutrient or contaminant from the soil profile.

Where precipitation is limited, seasonal or erratic, moisture can be conserved for crop use by maintaining crop residues on the soil surface to increase infiltration and to reduce runoff and evaporation.

Where improving water use efficiency on deep soils is a concern, rotating deep rooted crops with shallow rooted crops can help utilize all available water in the soil profile.

Crop damage by wind can be reduced using this practice by selecting crops which are tolerant to abrasion from wind blown soil or tolerant to high wind velocity. If crops sensitive to wind damage are grown, the potential for plant damage can be reduced using Pacific Basin standard, Windbreak/Shelterbelt Establishment (380), or other approved methods of wind control.

Soil compaction can be reduced by this practice when rotations including deep rooted crops (able to extend to and penetrate the compacted soil layers) are used in combination with deep tillage, controlled traffic, or management of grazing animals to prevent, or breakup, compacted layers.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared

for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard.

Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation. As a minimum, the type of crop (root crop, low or high residue crop, vegetable crop) will be documented. Additionally, the name of each crop and their re-occurring sequence will be documented. Optimally, plant densities and planting dates should be documented.

OPERATION AND MAINTENANCE

Rotations shall provide for acceptable substitute crops in case of crop failure or shift in planting intentions for weather related or economic reasons. Acceptable substitutes are crops having similar properties that meet the criteria for all the resource concerns identified for the field or treatment unit.